



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/652,483	09/02/2003	Dunling Li	TI-36843	2318

23494 7590 11/01/2005

TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER

BRINEY III, WALTER F

ART UNIT	PAPER NUMBER
----------	--------------

2646

DATE MAILED: 11/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/652,483

Applicant(s)

LI, DUNLING

Examiner

Walter F. Briney III

Art Unit

2646

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 November 2003 and 22 July 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. **Claims 1, 4-6, 9 and 12-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsieh (US Patent Application Publication 2004/0176062).**

Claim 1 is limited to *a method for defining tone signals in a voice activity detection (VAD) device*. In rejecting this claim it is noted that Hsieh discloses a method for detecting a tone signal through digital signal processing. See Abstract. In operation, the tone detector of Hsieh performs a zero crossing rate (ZCR) measurement of an input signal in step (106) of figure 4. See paragraph 21. Following the ZCR measurement, a set of parameters from a plurality of zero crossing periods contained within a frame period are extracted in steps (108) and (110). See paragraphs 22 and 23. The parameters are used to calculate an average value and a variance in steps (114) and (116). See paragraphs 25 and 26. Finally in step (118) the variance is compared to a threshold, the result determining the presence or absence of a tone. See paragraph 27. With respect to the claim language, it is submitted that step (106) corresponds to the step of calculating a zero crossing rate of a signal; steps (108) and (110) correspond to extracting a set of parameters from a plurality of duration periods of

said signal; steps (114) and (116) correspond to calculating a maximum difference between said plurality of duration periods; and step (118) corresponds to comparing said maximum difference with said threshold. Furthermore, the fact that the variance is compared against a threshold inherently necessitates the first step of the method as claimed, i.e. defining a threshold for zero amplitude change. Therefore, Hsieh anticipates all limitations of the claim.

Claim 4 is limited to *the method of claim 1*, as covered by Hsieh. When a zero crossing period is not detected in step (106), the method of figure 4 loops back to the initial filtering steps and attempts to discover a period in view of further samples. In this way, a range of the input signal is defined, where the range includes a zero crossing point. After a period has been determined in this way, its parameters are extracted in steps (108) and (110); an average and variance for a plurality of periods contained within a frame period are calculated in steps (114) and (116); and the variance is compared to a threshold in step (118). Therefore, Hsieh anticipates all limitations of the claim.

Claim 5 is limited to *the method of claim 1*, as covered by Hsieh. The variance corresponds to the maximum difference, and is inherently of the form $E((X - \mu)^2)$. In other words, the variance is the average of the square of the distance of each data point from the mean. In this case, X corresponds to the number of samples of each period calculated in step (110) and μ correspond to the average calculated in step (114). In this way, it can be seen that the variance is calculated between a sum of all said

durations (μ) and a single said duration (X). Therefore, Hsieh anticipates all limitations of the claim.

Claim 6 is limited to *the method of claim 1*, as covered by Hsieh. The variance corresponds to the maximum difference, and is inherently of the form $E((X - \mu)^2)$. In other words, the variance is the average of the square of the distance of each data point from the mean. In this case, X corresponds to the number of samples of each period calculated in step (110) and μ correspond to the average calculated in step (114). In this way, it can be seen that the variance is calculated using a mean difference $E((X - \mu)^2)$ between a sum of all said durations (μ) and a single said duration (X). Therefore, Hsieh anticipates all limitations of the claim.

Claims 9 and 12-14 are limited to essentially the same subject matter as claims 1, 4, 5 and 6, as covered by Hsieh in view of Tasaki, and are rejected for the same reasons.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh.**

Claim 7 is limited to *the method of claim 1*, as covered by Hsieh. It is noted that the tone detection algorithm disclosed by Hsieh is not specifically directed toward

Art Unit: 2646

detecting signals according to the ITU G.729 Annex B for a VAD device. Therefore, Hsieh anticipates all limitations of the claim with the exception noted above.

In addition to detecting tones according to CTCSS standards, Hsieh discloses that the tone detecting method disclosed therein is applicable in other apparatuses for detecting signals of predetermined frequency. The examiner takes Official Notice of the fact that the ITU G.729 Annex B recommendation for VAD devices was well known at the time of the invention. Furthermore, it is known from the disclosure of Hsieh that tone detection can be performed using the method discussed therein for any various tones of predetermined frequency, e.g. ITU G.729 Annex B tones.

It would have been obvious to one of ordinary skill in the art at the time of the invention to detect tones defined under the ITU G.729 Annex B recommendation for VAD devices using the method of Hsieh, which provides advantages over the prior art as recited in the section entitled Description of the Prior Art and Summary of Invention.

Claim 15 is limited to essentially the same subject matter as claim 7, as covered by Hsieh in view of Tasaki, and is rejected for the same reasons.

3. **Claims 2, 3, 8, 10, 11 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh in view of Tasaki (US Patent 6,526,378).

Claim 2 is limited to *the method of claim 1*, as covered by Hsieh. It will be appreciated that Hsieh simply fails to supply a method of calculating the ZCR of the input signal. Therefore, Hsieh anticipates all limitations of the claim with the exception wherein calculating said zero crossing rate comprises: determining... and defining.

Tasaki teaches a prior art zero crossing method that overcomes the deficiency noted in the previous paragraph. Specifically Tasaki teaches a method and apparatus for processing sound signal. See Abstract. Of most concern though is the simple zero crossing rate calculator as taught in column 23, lines 52-62. In operation, two adjacent samples are multiplied. If and only if their result is equal to or less than zero, a zero cross will have been detected and counted. In this way, a sample with a zero value is logically determined to have a tangent value in the direction of the previous sample towards zero, and the zero value sample is logically defined as a non-zero value that satisfies a zero cross condition for the logically determined tangent. The above discussed logical steps of determining and defining correspond to the steps of determining and defining as recited.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a ZCR as taught by Tasaki if for no other reason than Hsieh fails to disclose the particulars of zero crossing rate determination, which necessitates the need to find an enabling teaching within the prior art.

Claim 3 is limited to *the method of claim 2*, as covered by Hsieh in view of Tasaki. The logical definition of a zero-valued sample provided for by Tasaki necessitates logically defining a zero-valued sample as a non-zero value based on the tangent as logically determined. Therefore, Tasaki anticipates all limitations of the claim.

Claim 8 is limited to *the method of claim 1*, as covered by Hsieh. It will be appreciated that Hsieh simply fails to supply a method of calculating the ZCR of the

Art Unit: 2646

input signal. Therefore, Hsieh anticipates all limitations of the claim with the exception wherein said calculating said maximum difference comprises calculating a product between the sample and the sample's adjacent sample in a group of signal samples.

Tasaki teaches a prior art zero crossing method that overcomes the deficiency noted in the previous paragraph. Specifically Tasaki teaches a method and apparatus for processing sound signal. See Abstract. Of most concern though is the simple zero crossing rate calculator as taught in column 23, lines 52-62. In operation, two adjacent samples are multiplied. If and only if their result is equal to or less than zero, a zero cross will have been detected and counted. It is submitted that the zero crossing rate calculation above is integral to determining the maximum difference, and therefore, comprises the calculating of said maximum difference.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a ZCR as taught by Tasaki if for no other reason than Hsieh fails to disclose the particulars of zero crossing rate determination, which necessitates the need to find an enabling teaching within the prior art.

Claims 10, 11 and 16 are limited to essentially the same subject matter as claims 2, 3 and 8, as covered by Hsieh in view of Tasaki, and are rejected for the same reasons.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter F. Briney III whose telephone number is 571-272-7513. The examiner can normally be reached on M-F 8am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

WFB
10/25/05



SINH TRAN
SUPERVISORY PATENT EXAMINER